

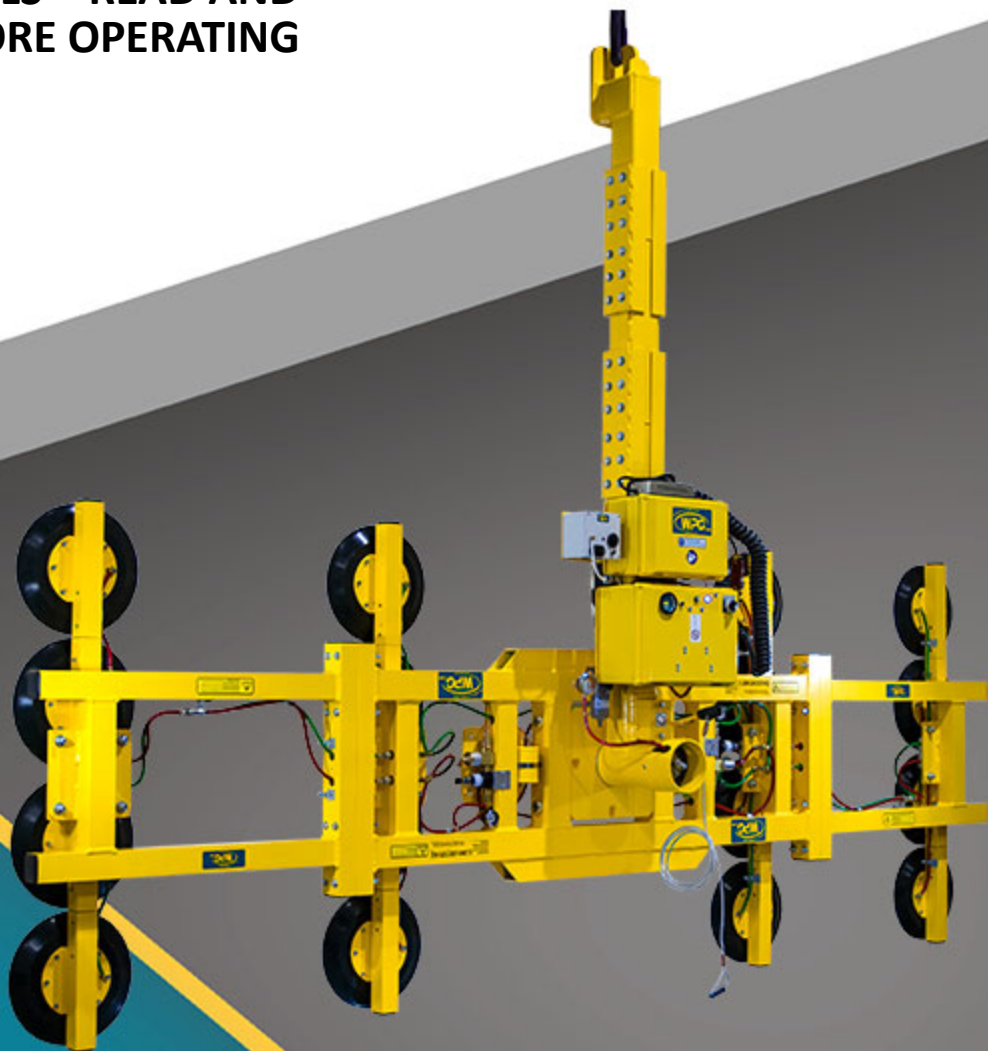
KEEP FOR FUTURE REFERENCE

OPERATING INSTRUCTIONS



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www.WPG.com

 **INTENDED FOR USE BY SKILLED
PROFESSIONALS • READ AND
UNDERSTAND BEFORE OPERATING**



**MANUAL
ROTATOR 2800,
DC-VOLTAGE WITH
DUAL VACUUM SYSTEM OPTION**

(Available with REMOTE CONTROL SYSTEM)

Model number: MR1611LDCO

Record serial number in blank space above (to locate, see serial label on the product).







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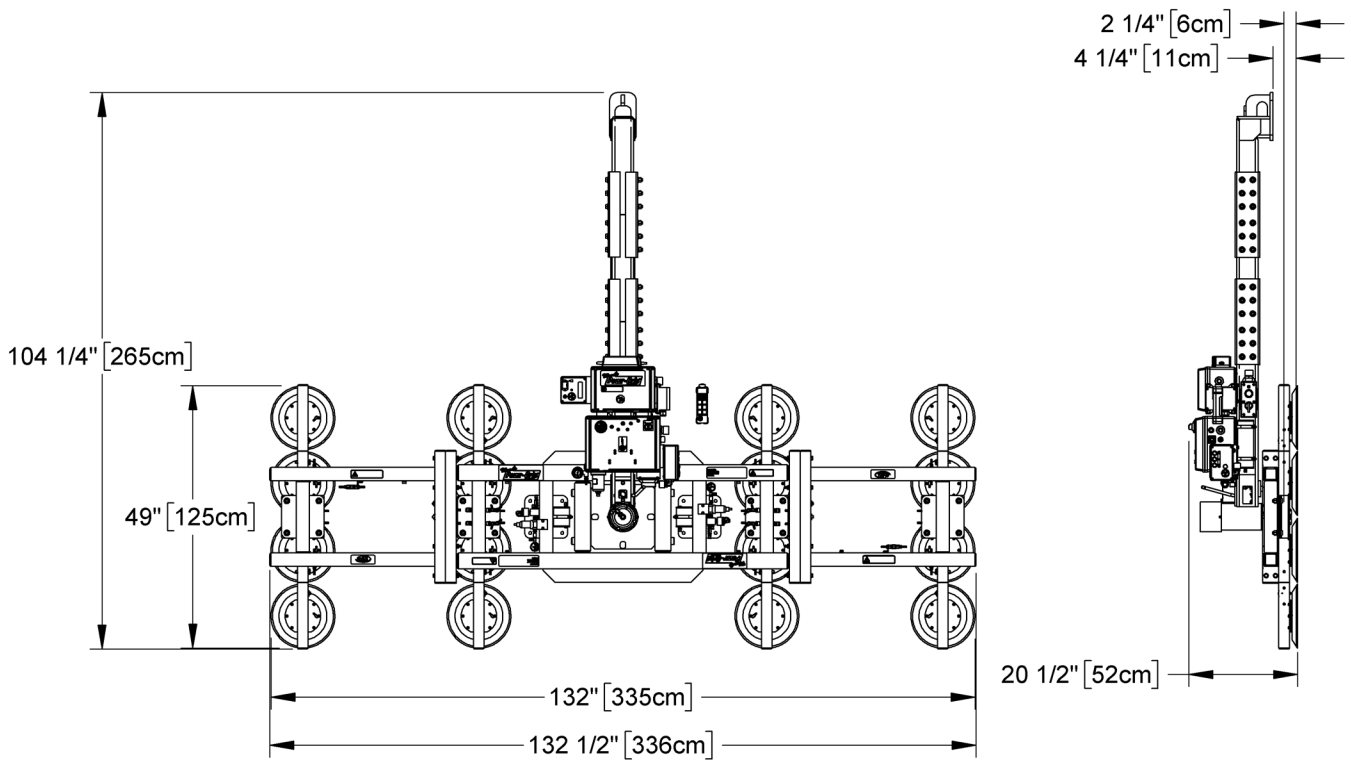
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SPECIFICATIONS

Product Description	Designed for use with hoisting equipment, MR16-DCO-DVS lifters support loads using vacuum and manipulate loads using manual 360° rotation.
Model Number	MR1611LDCO
Vacuum Pads (standard rubber ¹)	Sixteen 11" [28 cm] nominal diameter, lipped (Model G3370)
Pad Spread (to outer edges)	Minimum: 40¾" x 12" [103 cm x 30 cm] Maximum: 169" x 49" [430 cm x 125 cm]
 Maximum Load Capacity ²	Per pad: 175 lbs [79.5 kg] With 16 pads: 2800 lbs [1270 kg]
 Lifter Weight	700 lbs [318 kg]
Power Source	12 volts DC, 26 amps
Battery Capacity	26 amp-hours
 Rotation Capability	Manual, 360°, with automatic locking at each ¼ turn (when desired)
 Product Options	<i>Equipped with Dual Vacuum System. Available with Remote Control System. Available with Short Lift Bar. See separate instructions about other optional features.</i>
 Operating Elevation	Up to 6,000' [1,828 m]
 Operating Temperatures	32° — 104° F [0° — 40° C]
Service Life	20,000 lifting cycles, when used and maintained as intended ³
ASME Standard BTH-1	Design Category "B", Service Class "O"
Troubleshooting Guide ⁴	TST-016_GENERIC_LEAK_TEST_rev_2014-086

- 1..... Available with other rubber compounds for special purposes (see www.wpg.com).
- 2..... The Maximum Load Capacity is rated at a vacuum of 16" Hg [-54 kPa] on clean, smooth, nonporous flat surfaces with a friction coefficient of 1. Pad compound, load rigidity, strength, surface conditions, overhang, angle, center of gravity and temperature can also affect the lifting capacity. A "qualified person" should evaluate the effective lifting capacity for each use (see definition under "Rated Load Test" on page 35).
- 3..... Vacuum pads, filter elements and other wear-out items are excluded.
- 4..... To view this guide, search for your lifter's Model Number at www.wpg.com and select the "Troubleshooting" link on the product page.

SPECIFICATIONS



Note: A model MR1611LDCO with lift bar extension is shown.

SAFETY



Wear personal protective equipment that is appropriate for the load material. Follow trade association guidelines.



Do not remove or obscure safety labels.



Do not make any modifications to the lifter (see "LIMITED WARRANTY").



Use the lifter only in an approved "OPERATING ENVIRONMENT" (see "INTENDED USE").



Do not use a lifter that is damaged, malfunctioning, or missing parts.



Do not use a lifter if the sealing edge of any vacuum pad is cut or otherwise damaged.



Do not use a lifter to lift cracked or broken glass.



Do not exceed the Maximum Load Capacity or lift loads the lifter is not designed for (see "INTENDED USE").



Do not use a lifter if the Maximum Load Capacity or any safety label appears to be missing or obscured.



Make sure the contact surfaces of the load and vacuum pads are clean before attaching the lifter (see "MAINTENANCE").



Position the vacuum pads correctly on the load before lifting (see "OPERATION: Positioning the Lifter on the Load").



Do not lift a load if any vacuum indicator shows inadequate vacuum.



Keep unauthorized personnel away from the lifter, to avoid injury in case of an unintended load release.



Do not touch the vacuum release controls during a lift.



Do not allow people to ride on the lifter or the load.



Do not lift a load higher than necessary or leave suspended loads unattended.



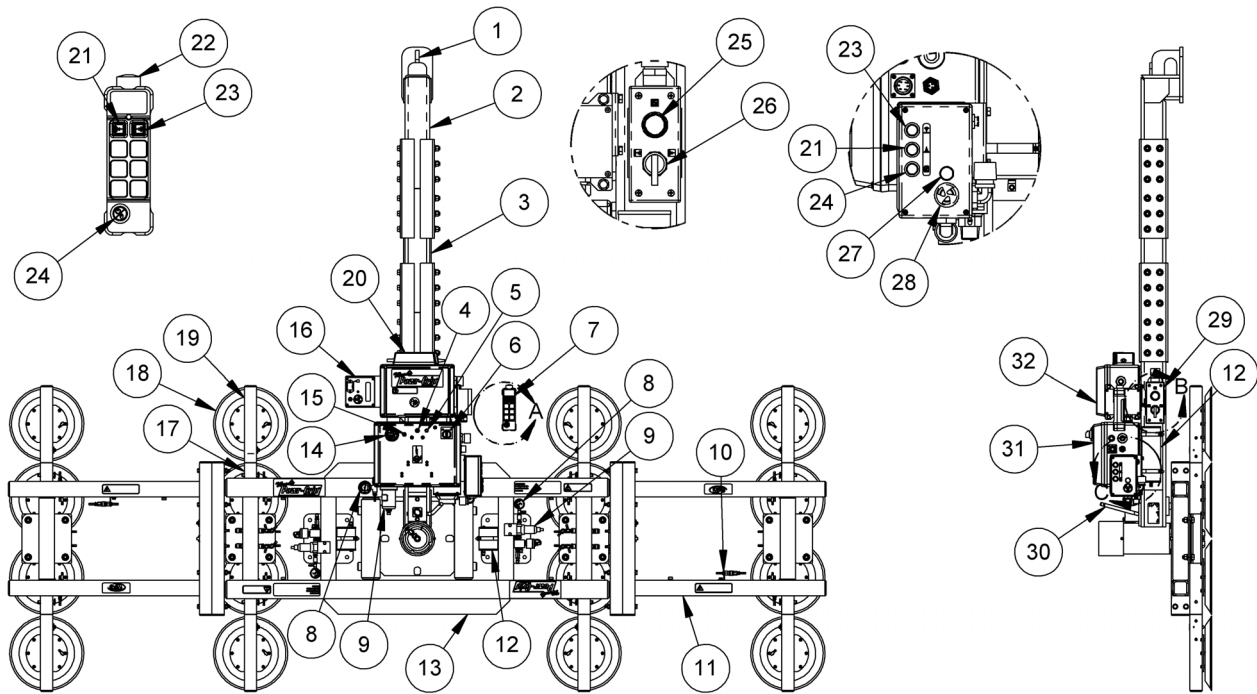
Do not position a loaded or unloaded lifter over people.



Before servicing a powered lifter, place the power control in the inactive position and, when possible, disconnect the power source.

OPERATING FEATURES

Features shown here are underlined> on their first appearance in each section following.



- | | | | | | |
|----|--|----|--|----|--|
| 1 | LIFT POINT | 2 | UPPER SECTION of LIFT BAR | 3 | LIFT BAR EXTENSION |
| 4 | CIRCUIT BREAKER | 5 | POWER LIGHT | 6 | POWER SWITCH |
| 7 | RADIO TRANSMITTER
(remote control option) | 8 | VACUUM GAUGE (2 small, 1 large) | 9 | AIR FILTERS |
| 10 | QUICK CONNECTOR | 11 | REMOVABLE SECTION of PAD
FRAME | 12 | VACUUM RESERVE TANKS |
| 13 | CENTER SECTION of PAD
FRAME | 14 | BATTERY GAUGE | 15 | BATTERY TEST BUTTON |
| 16 | VACUUM LOSS WARNING BUZZER
(option) | 17 | ROTATING PAD ARM | 18 | VACUUM PAD |
| 19 | REMOVABLE PAD ARM | 20 | BATTERY CHARGER | 21 | "ATTACH" BUTTONS
(remote control option) |
| 22 | EMERGENCY STOP BUTTON
(remote control option) | 23 | "RELEASE" BUTTONS
(remote control option) | 24 | POWER / "FUNCTION" BUTTON
(remote control option) |
| 25 | VACUUM LIFT LIGHT / "FUNCTION"
BUTTON (remote control option) | 26 | ATTACH/RELEASE SWITCH | 27 | VACUUM LIFT LIGHT |
| 28 | LOW VACUUM WARNING BUZZER
(remote control option) | 29 | MOVABLE CONTROL PENDANT | 30 | ROTATION RELEASE LEVER |
| 31 | Enclosure with VACUUM PUMP and
VACUUM SWITCH | 32 | Enclosure with BATTERY | | |

Note: A standard MR1611LDCO with Dual Vacuum System is shown. Although some of the following photos do not show this specific lifter, they all illustrate how this kind of lifter functions.

For information about specific parts, see ["REPLACEMENT PARTS"](#) on page 40 and/or any separate instructions for Product Options.

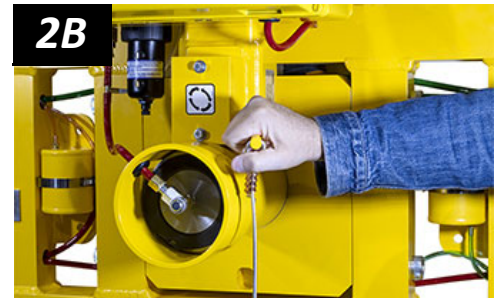
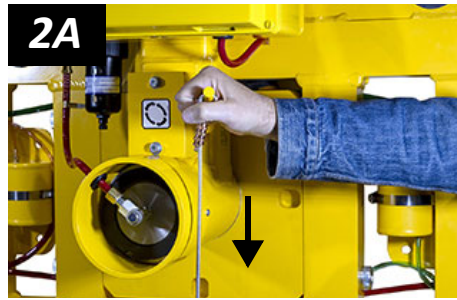
ASSEMBLY

Note: If the lifter is packed in optional shipping crate #53042, consult the ASSEMBLY instructions provided with the crate.

- 1) Open the shipping box and remove all unattached lifter components. Then disassemble the box, to allow rotation of the lift bar assembly.

Note: The box can be disassembled without cutting it. Save the box and other shipping materials for future use.

- 2) Disengage the rotation latch (figs. 2A-B). Rotate the lower section of the lift bar until it is perpendicular to the center section of the pad frame and make sure the latch engages.



- 3) Install the upper section of the lift bar and, if necessary, the lift bar extension (see “[To CHANGE THE LIFT BAR](#)” on page 17):

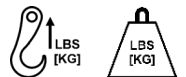
- Install the upper section of the lift bar **with** the extension (fig. 3A) if you intend to use the removable sections of the pad frame (see “[Installing/Removing the Removable Sections of the Pad Frame](#)” on page 13).



- Otherwise, install the upper section of the lift bar **without** the extension.

- 4) Suspend the lifter from appropriate hoisting equipment:

- 4.1) Select a crane and/or hoist rated for the Maximum Load Capacity plus the Lifter Weight.



Note: Any lifter use must comply with all statutory or regulatory standards for hoisting equipment in your region.

ASSEMBLY

4.2) Attach the hoisting hook to the lift point (fig. 4A).

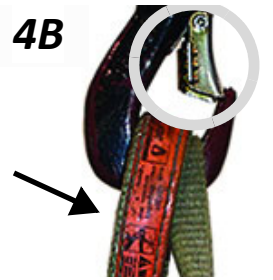


Make sure hook has restraining latch (circled in fig. 4B).

4A



4B



Use rigging as needed (arrow in fig. 4B) to make sure the hook does not interfere with the load.

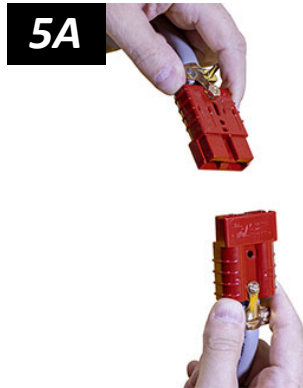


Only use rigging rated for Maximum Load Capacity plus Lifter Weight.

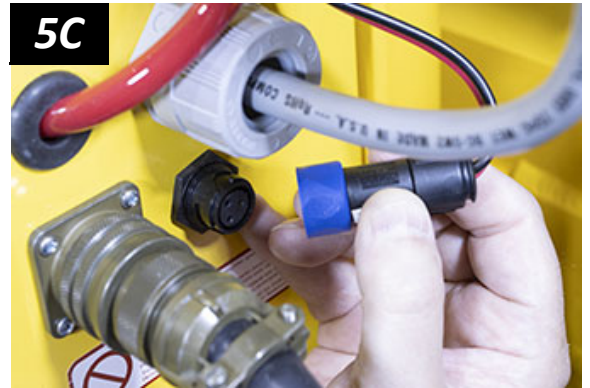
4.3) Use the hoisting equipment to suspend the lifter. Avoid damaging the vacuum pads.

5) Connect the electrical connectors (figs. 5A-B and 5C-D).

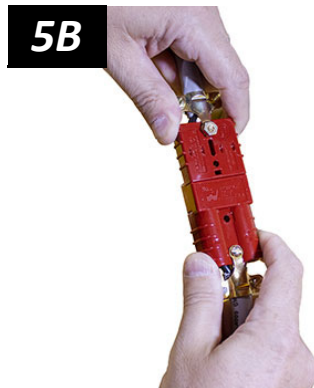
5A



5C



5B



5D



6) Assemble the pad frame for optimal load support (see [“TO CHANGE THE PAD FRAME CONFIGURATION”](#) on page 9). Store unused components in a clean, dry location.

7) Remove the pad covers (fig. 7A) and save them for future use.

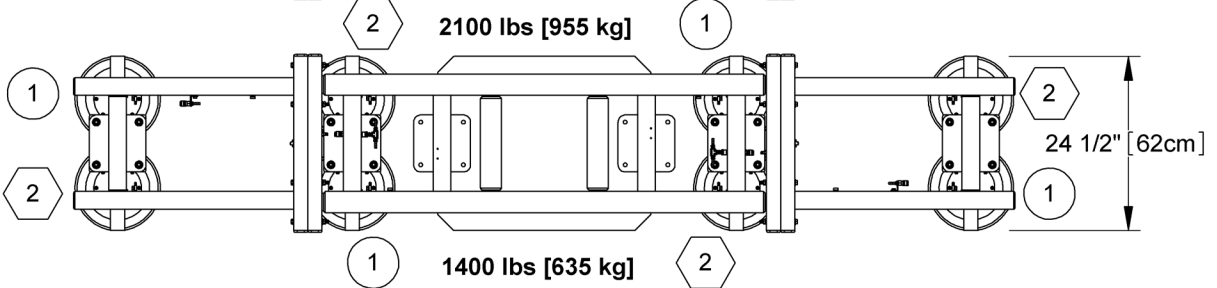
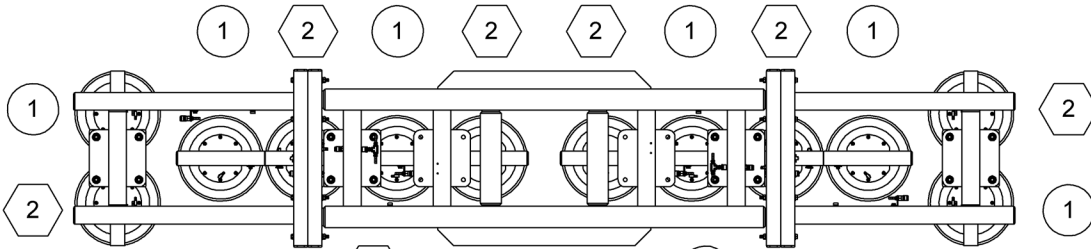
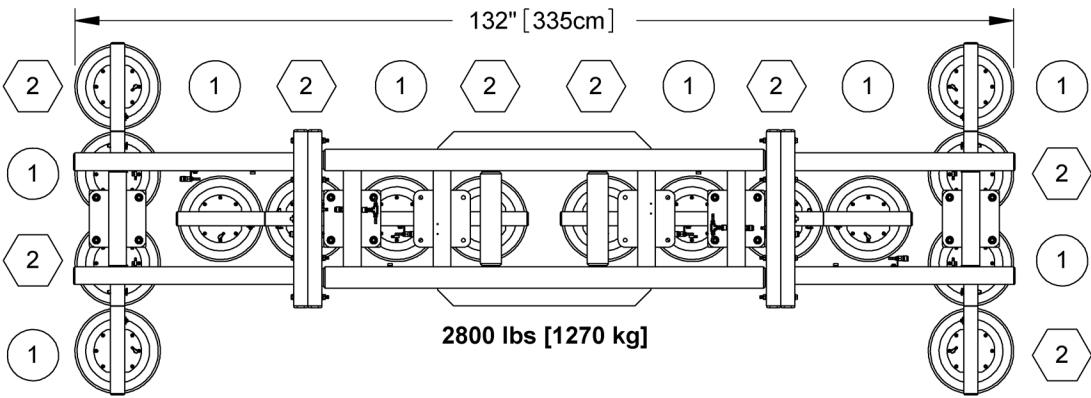
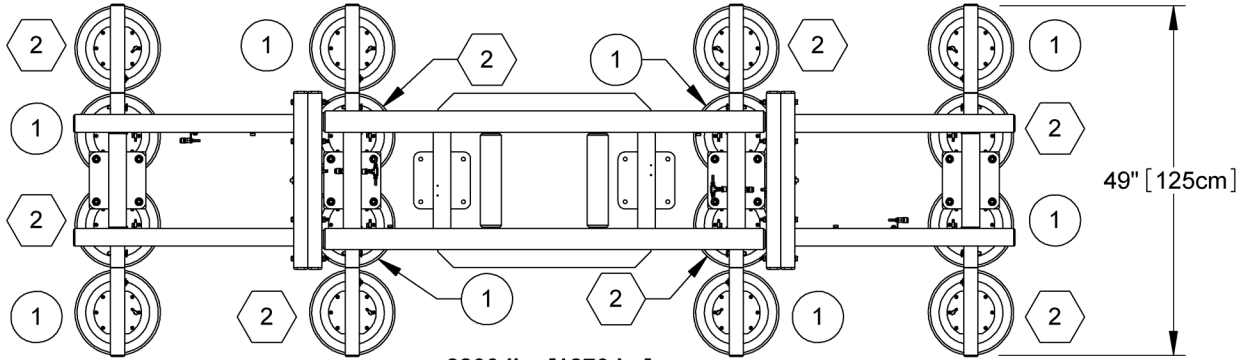
7A



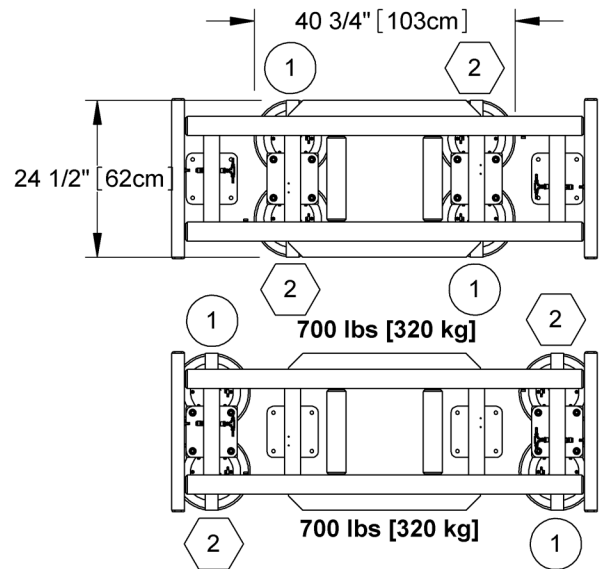
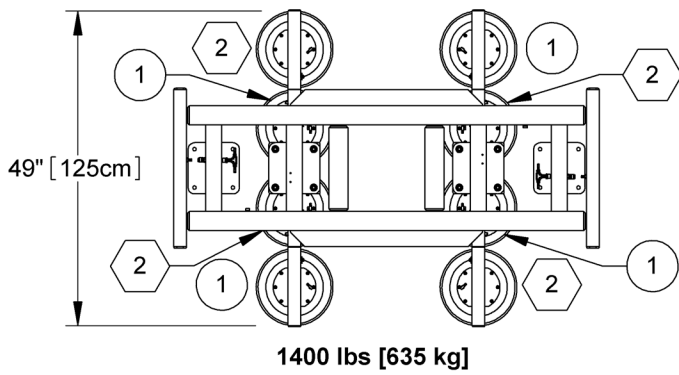
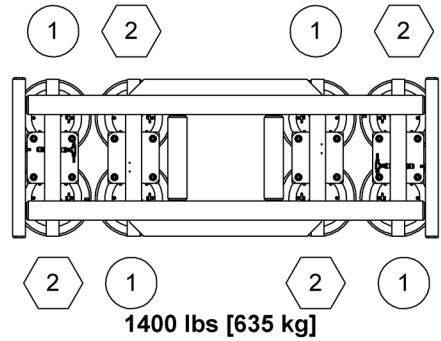
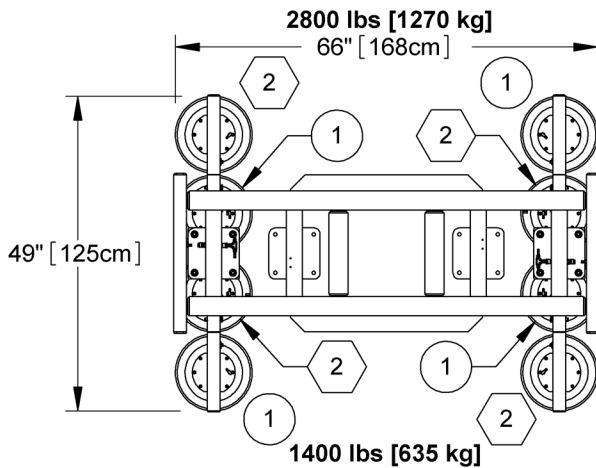
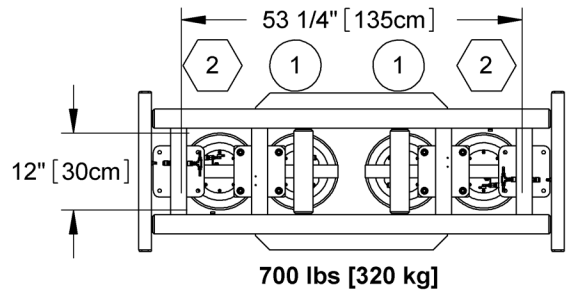
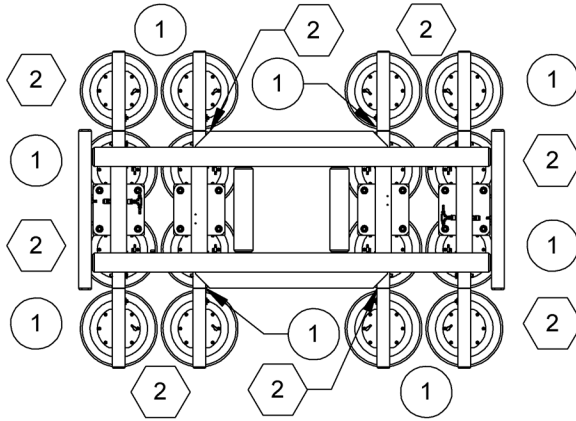
8) Perform tests as required under [“TESTING”](#) on page 33.

ASSEMBLY

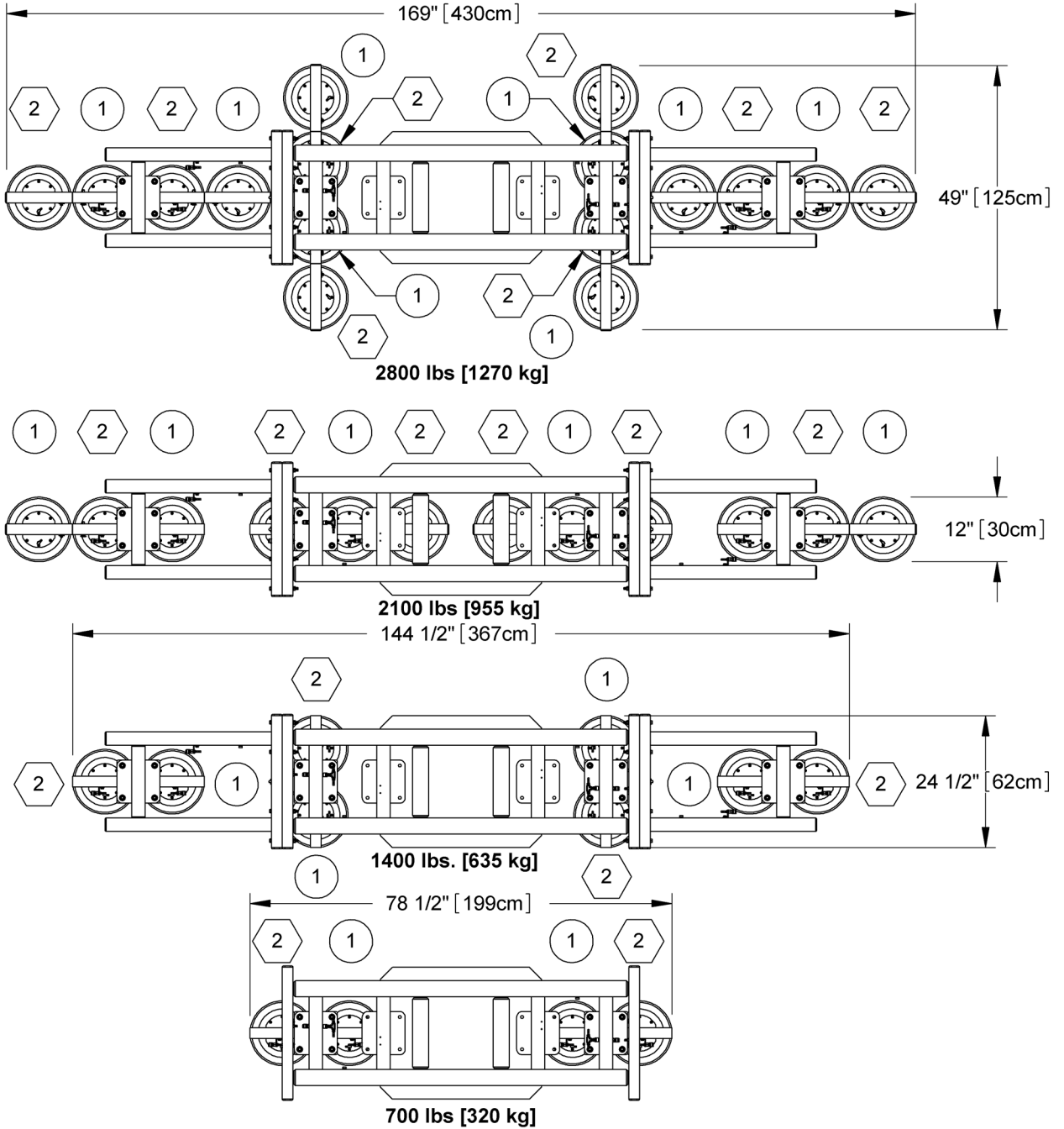
TO CHANGE THE PAD FRAME CONFIGURATION



ASSEMBLY



ASSEMBLY



ASSEMBLY

Various pad frame configurations enable the lifter to match different load dimensions and weights. The illustrations on pages 9-11 show all approved configurations. Pad Spread and Maximum Load Capacities are listed for a standard MR1611LDCO lifter.

Caution: Connect the vacuum pads to the 2 circuits of the dual vacuum system (marked “1” and “2” in the preceding illustrations).

- 1) Choose an approved configuration to maximize support across the load surface and to minimize load overhang (see “[LOAD CHARACTERISTICS](#)” on page 18).



Use only approved pad frame configurations.

- 2) Install or remove the pad frame’s removable sections and removable pad arms and/or the rotating pad arms as needed (see following sections). Some configurations also require the lift bar extension (see “[Installing/Removing the Lift Bar Extension](#)” on page 17).

- To support the maximum load weight, you must install all vacuum pads on the pad frame and connect all vacuum hoses to the vacuum pads, using the quick connectors (see “[Connecting/Disconnecting Vacuum Hoses](#)” on page 15).



Securely position vacuum hoses to avoid damage during lifter operation.

- To support smaller weights and dimensions, you may remove some removable sections, removable arms and/or vacuum pads, and disconnect the corresponding vacuum hoses,



Disconnecting or removing any vacuum pad reduces lifting capacity.

provided the lifter still has sufficient capacity to support the load in question.¹

1..... Whenever a quick connector is disconnected, the corresponding vacuum pad does not contribute to the lifting capacity, whether or not the pad is mounted on the pad frame.

ASSEMBLY

Installing/Removing the Removable Sections of the Pad Frame

Caution: The lift bar extension must be used whenever the removable sections are installed on the pad frame. Otherwise, the extended pad frame would strike the lift point during rotation.

- 1) Align a removable section with the center section of the pad frame (ie, align the bolt holes on each side of the joint where the removable section attaches to the center section).
- 2) Insert the 8 bolts for a removable section through the bolt holes and tighten the bolts securely (fig. 2A). Make sure the bolt spacers located inside the pad frame remain in place.
- 3) Remove the male end of the quick connector from the spring clip (circled in fig. 3A) on the pad frame's removable section. Route the vacuum hose through the opening for this purpose at the pad frame joint. Connect the quick connectors (see "[Connecting/Disconnecting Vacuum Hoses](#)" on page 15).
- 4) Repeat steps 1-3 to install the other removable section.

Note: To remove the pad frame's removable sections, reverse this procedure.

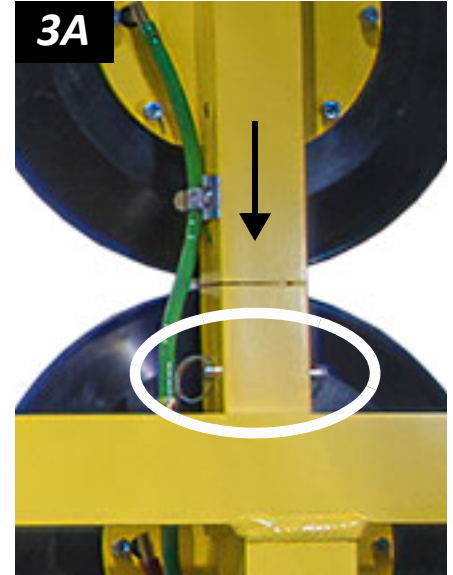


ASSEMBLY

Installing/Removing the Removable Pad Arms

- 1) Insert the end of a removable pad arm in one socket on the pad frame (arrow in fig. 1A), so that the holes align for the cotterless hitch pin.
- 2) Secure the removable pad arm on the frame with the hitch pin (circled in fig. 1A).
- 3) Remove the end of the quick connector from the spring clip on the pad arm. Connect the quick connectors (see [“Connecting/Disconnecting Vacuum Hoses”](#) on page 15).
- 4) Repeat steps 1-3 to install each pad arm required for the chosen pad frame configuration.

Note: To remove the removable pad arms, reverse this procedure. Store removed pad arms in a clean, dry location.



Rotating the Rotating Pad Arms

- 1) Remove the 4 bolts that secure each rotating pad arm on the pad frame (circled in fig. 1B).
- 2) Rotate the arm 90° and reinstall the bolts.

Caution: Routing for the vacuum hoses allows the arm to be rotated in one direction only. Do not attempt to rotate the arm in the opposite direction, because this can damage the vacuum hose.

- 3) Repeat steps 1-2 to rotate each pad arm as required for the chosen pad frame configuration.



ASSEMBLY



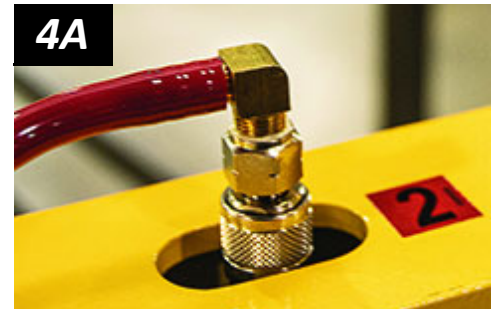
Connecting/Disconnecting Vacuum Hoses

To *connect* a vacuum hose, push the male and female ends of the quick connector together until they lock (fig. 1A).

To *disconnect* a vacuum hose, move the release ring on the female end until the quick connector separates (fig. 2A).

! *Make sure quick connectors seal completely and all vacuum hoses function correctly (see "Vacuum Test" on page 32).*

Make sure all hoses are connected correctly: Green hose to circuit 1 (fig. 3A) and red hose to circuit 2 (fig. 4A).



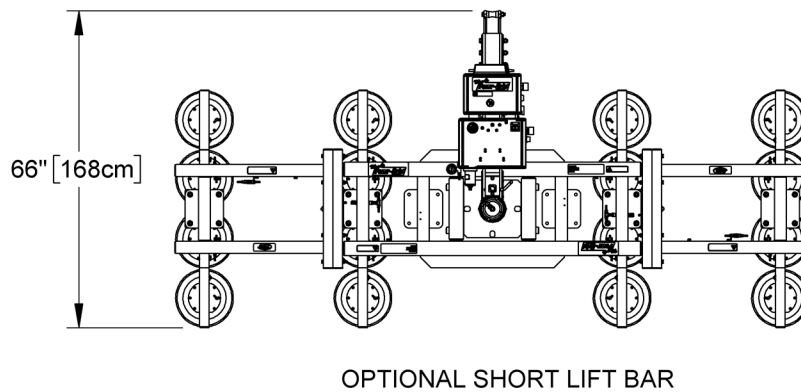
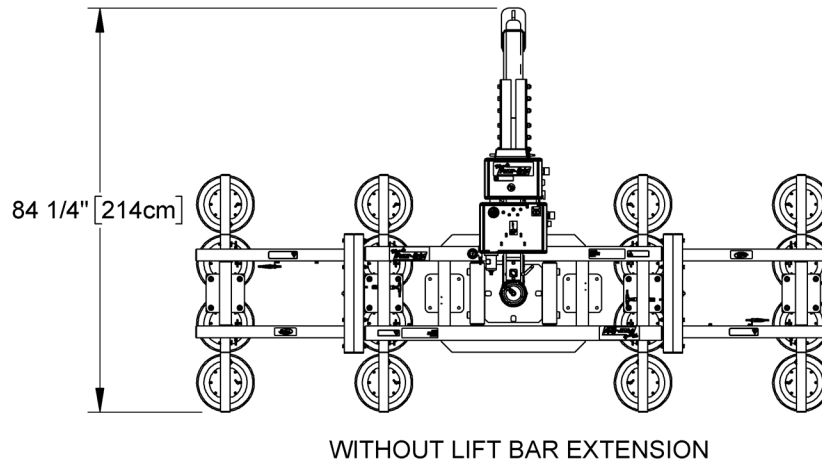
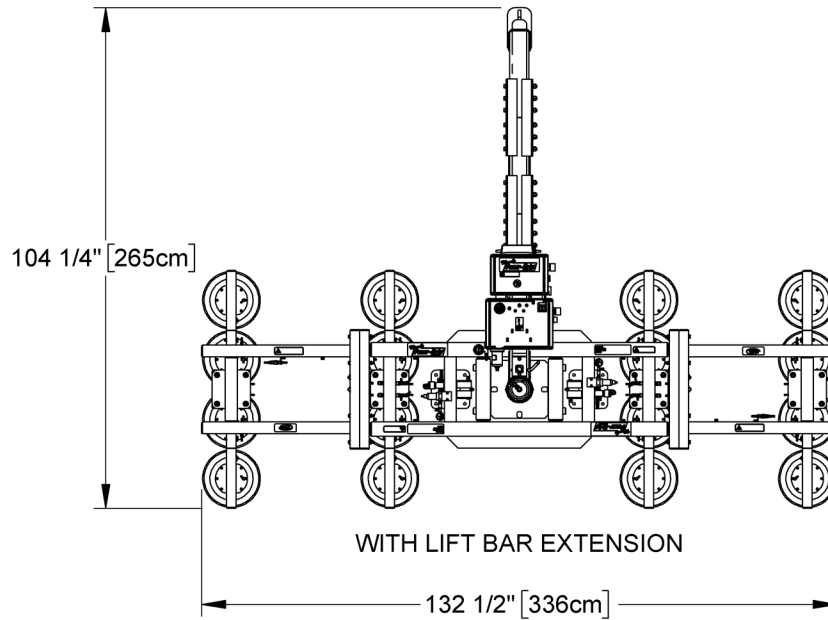
The 2 vacuum gauges are labeled to indicate the related circuits (fig. 5A).

Note: The gauge face colors do not correspond with the circuit colors.



ASSEMBLY

TO CHANGE THE LIFT BAR



ASSEMBLY

Installing/Removing the Lift Bar Extension

- 1) Support the lifter so that hoisting equipment is not required to hold it upright.
- 2) Remove the 12 bolts from the lift bar joint and remove the joint couplers.
- 3) Install the lift bar extension between the upper and lower sections of the lift bar.
- 4) Install joint couplers at the joints on either end of the lift bar extension.
- 5) Install and securely tighten the 12 bolts for each of the 2 lift bar joints.
- 6) To remove the lift bar extension, reverse this procedure.

Installing/Removing the Optional Short Lift Bar

The optional Short Lift Bar is designed for applications involving minimal clearance between the lifter and the hoisting equipment (eg



Maximum Load Capacity is 1,800 lbs [815 kg] when using Short Lift Bar.

installations under eaves). If applicable, install the Short Lift Bar directly to the lifter, as described in the preceding section. However, do *not* use the lift bar extension or joint couplers; instead, bolt the Short Lift Bar securely onto the lower section of the standard lift bar, using the hardware provided. To remove the Short Lift Bar, reverse this procedure.

INTENDED USE

LOAD CHARACTERISTICS

Make sure the vacuum lifter is intended to handle each load according to these requirements:



Do NOT lift explosives, radioactive substances or other hazardous materials.



- The load weight must not exceed the Maximum Load Capacity.
- The load must be a single piece of relatively nonporous material with a flat and relatively smooth contact surface.^{1, 2} To determine whether the load is too porous or rough, perform the “[Lifter/Load Compatibility Test](#)” on page 33.
- The load's contact surface must be able to obtain a friction coefficient of 1 with the lifter's vacuum pads (see “[Pad-to-Load Friction Coefficient](#)” on page 37). Otherwise, the capacity should be derated appropriately.
- The load's surface temperature must not exceed the Operating Temperatures.³
- The load's *minimum* length and width are determined by the current Pad Spread (see “SPECIFICATIONS” on page 3).
- The load's *maximum* length and width are determined by its allowable overhang.⁴
- 1" [2.5 cm] is the allowable thickness at Maximum Load Capacity.⁵



Note: Standard vacuum pads can stain or deform load surfaces with light colors or soft coatings. Test such surfaces for damaging effects before using the lifter on them.⁶

1..... Although concave vacuum pads can also attach to some curved loads, curvature can reduce lifting capacity. Contact WPG for more information.

2..... A “single piece” of material includes curtainwall assemblies, unitized glazing systems and similar construction units.

3..... Vacuum pads made from a heat-resistant rubber compound can enable you to lift loads with higher surface temperatures. Contact WPG or an authorized dealer for more information.

4..... The allowable overhang is the amount of load material that can extend sideways beyond the vacuum pads without breaking or otherwise being damaged. This depends on the load material, its thickness, and the angle of handling (if any). Since every material has different physical properties, the allowable overhang must be evaluated separately for each load type. Contact WPG or an authorized dealer for more information.

5..... However, the allowable thickness increases as load weight decreases. Contact WPG for more information.

6..... Alternative rubber compounds are available for these purposes. Contact WPG or an authorized dealer for more information.

INTENDED USE

OPERATING ENVIRONMENT

Make sure the vacuum lifter is intended for use in each work environment, given the following restrictions:

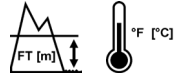
- This lifter is not intended for any environment that is dangerous to the operator or damaging to the lifter. Avoid environments containing explosives, caustic chemicals and other dangerous substances.

 **Never use lifter in dangerous environments.**



Metal particles and similar environmental contaminants could result in vacuum pump failure.

- The work environment is limited by the Operating Elevation and Operating Temperatures.^{1, 2}
- The lifter is not designed to be watertight. Do not use it in rain or other unsuitable conditions.



Moisture can result in reduced lifting capacity.

DISPOSAL OF THE LIFTER

After the Service Life of the vacuum lifter has ended (see “SPECIFICATIONS” on page 3), dispose of it in compliance with all local codes and applicable regulatory standards.

Note: Special disposal regulations may apply to the battery.

1..... Although lifter use may be possible at higher elevation, lifting capacity is reduced whenever the lifter is unable to attain vacuum in the green range on the vacuum gauges. Contact WPG for more information.

2..... Special provisions may allow the lifter to operate outside the specified temperature range. Contact WPG for more information.

BEFORE USING THE LIFTER

Determine whether the vacuum lifter is capable of each intended task (see “SPECIFICATIONS” on page 3 and “[INTENDED USE](#)” on page 18). Then complete the following preparations:

Taking Safety Precautions

- Be trained in all industry and regulatory standards for lifter operation in your region.
- Follow trade association guidelines about precautions needed for each load material.



Read all directions and safety rules before using lifter.



Always wear appropriate personal protective equipment.

Performing Inspections and Tests

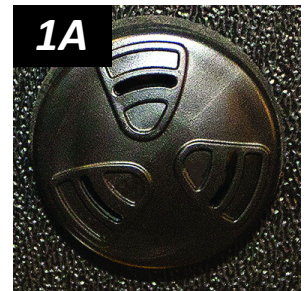
- Follow the “[INSPECTION SCHEDULE](#)” on page 32 and “[TESTING](#)” on page 33.
- Service the 3 air filters whenever a bowl contains liquid or other contaminants, or an element appears dirty (see “[AIR FILTER MAINTENANCE](#)” in [SERVICE MANUAL](#)).
- Make sure the low vacuum warning buzzer (fig. 1A) is clearly audible at the maximum distance between the operator and the lifter, despite any barriers or obstacles.^{1, 2}



Examine air filters regularly and service when needed.



Make sure warning buzzer can be heard over noise at operator position.



1..... Maximum buzzer volume is 103 dBA at 2' [60 cm]. If CE or UKCA Standards apply, consult EN 7731 to make sure the warning buzzer is compliant.

2..... The “[Vacuum Test](#)” on page 34 provides a convenient opportunity to check this.

OPERATION

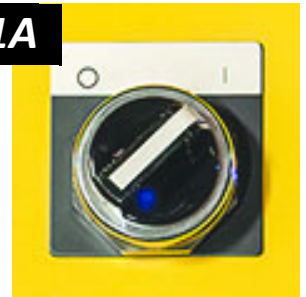
Checking the Battery

! Always check battery energy before every lift.

Use the battery gauge to determine whether the battery needs to be charged (see “[BATTERY RECHARGE](#)” on page 39):¹ Never use the lifter unless battery energy appears in the green range.

The power switch must be in the “on” position (| — fig. 1A) to check the battery.

1A



- If the lifter is *not* attached to a load (see “[TO RELEASE THE PADS FROM THE LOAD](#)” on page 29), make sure the attach/release switch is in the “neutral” position (fig. 1B). Then press the



battery test button (figs. 1C-D), to show the energy level.²

- If the lifter is attached to a load (see “[TO ATTACH THE PADS TO A LOAD](#)” on page 23), the battery gauge automatically shows the energy level.³


1..... If the vacuum pumps are running or the battery charger is connected to an AC power source, the battery gauge will show an inaccurate energy level.

2..... If the lifter has not been used since the battery was charged, the battery gauge may falsely show a high energy level. This “surface charge” dissipates after the pumps run for about 1 minute, allowing the gauge to show accurate energy.

3..... After the pumps stop running, the battery gauge requires a few moments to stabilize before it shows an accurate energy level.

OPERATION

Preparing to Use the Remote Control System

 The optional radio transmitter (fig. 1A) and radio receiver enable you to activate the lifter's "attach" and "release" functions at distances up to 250' [76 m], provided you have a clear and direct view of the lifter and its status indicators.

To operate a lifter remotely, follow these safety rules:

- Visually verify the status of the lifter and load prior to lifting.



Make sure nearby personnel are aware of intended remote control actions.

- Monitor the lifter at all times to make sure it is functioning as intended.¹
- Be sure the load is lowered and supported correctly before releasing it (see following sections).

Note: To prevent any radio transmission, press the emergency disconnect button.²

1A



- 1 EMERGENCY DISCONNECT BUTTON
- 2 TRANSMISSION INDICATOR LIGHT
- 3 "RELEASE" BUTTON
- 4 "ATTACH" BUTTON
- 5 POWER/"FUNCTION" BUTTON

1..... The Remote Control System is designed to prevent multiple lifters from responding. Nevertheless, radio-controlled lifters should be tested to make sure each transmitter controls only one lifter.

2..... To reset the emergency disconnect button, twist the button clockwise and allow it to spring outward to its original position.

OPERATION

TO ATTACH THE PADS TO A LOAD

Powering Up the Lifter


Place the power switch in the “on” position (| — fig. 1A).¹


Note: When the operator powers up the lifter, either the stand-by function or the “attach” function is automatically activated, depending on which was used last.

2B



Placing the power switch in the “off” position (○) during lifter operation could result in a load release and personal injury (see “[In Case of a Power Failure](#)” on page 27).

 **Do not place power switch in “off” position (○) while operating lifter.**

 To use the optional Remote Control System, briefly hold the power button (⏻ — fig. 1B) on the radio transmitter to activate it.²

2B



Note: When you hold any button on the transmitter, the transmission indicator light flashes green if the transmitter is activated.

Positioning the Lifter on the Load

Caution: This lifter must be attached only to vertically oriented loads.

1) Make sure the contact surfaces of the load and vacuum pads are clean (fig. 1C; see “[Pad Cleaning](#)” on page 38).

1C



2) Center the pad frame on the load (fig. 2C).³

2C



1..... If any powered component fails to function while the power switch is in the “on” position, examine each circuit breaker (next to power switch) to determine whether it has interrupted the electrical circuit to the component. Although you can reset the circuit breaker, the power interruption may indicate an electrical problem that requires attention. Any fault must be corrected before resuming normal operation of the lifter.

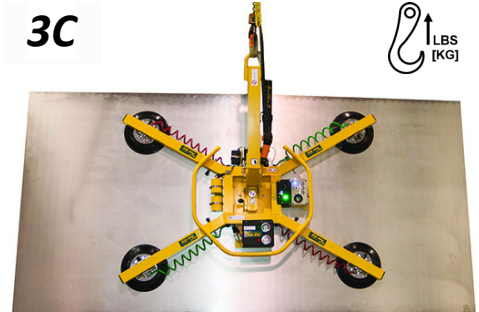
2..... The radio transmitter turns off automatically after a period of inactivity. The operator may also operate the lifter without using the transmitter.

3..... The lifter is designed to handle the maximum load weight when the load’s center of gravity is positioned within 2” [5 cm] of the lifter’s rotation axis. Uncentered loads may rotate unexpectedly.

OPERATION

- 3) Make sure all vacuum pads will fit on the load and will be loaded evenly (fig. 3C). Consult the Per-Pad Load Capacity.
- 4) Place the vacuum pads in contact with the load surface.

3C



Sealing the Pads on the Load

! Keep attach/release switch in "attach" position throughout lift.


Turn the attach/release switch on the movable control pendant to the "attach" position (↩ — fig. 1D), to engage the vacuum pump.

1D



Disconnecting the control pendant during lifter operation is likely to result in a load release and personal injury.

⊘ Do not disconnect control pendant during lifter operation.

 To use the optional Remote Control System, press the "attach button (↩ — fig. 2D) on the radio transmitter.

2D



The low vacuum warning buzzer, if present, sounds an alarm until the lifter attains sufficient vacuum.

⊘ Never lift a load while alarm is sounding.

Press the lifter firmly against the load to help the pads begin to seal.¹

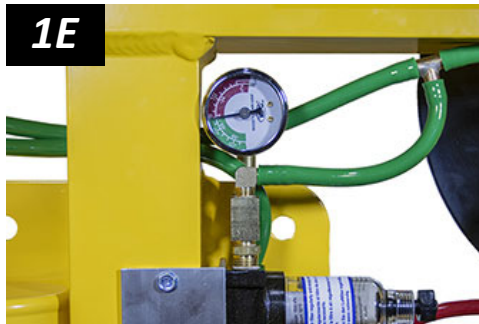
1..... Although a vacuum pad may become distorted during shipping or storage, this condition should correct itself with continued use.

OPERATION

Reading the Vacuum Gauges

The lifter is equipped with 3 vacuum gauges:

- A *small* vacuum gauge is located on each side the pad frame, to indicate the current vacuum level in each circuit of the lifter's vacuum system (fig. 1E).



- A third, *large* vacuum gauge (fig. 2E) is located on the lower section of the lift bar. It indicates the lower of the vacuum levels existing in the 2 circuits, so long as the air filters on each side of the pad frame are properly maintained (see “[Performing Inspections and Tests](#)” on page 20).



A vacuum gauge shows the current vacuum level in positive inches of Hg and negative kPa:

- *Green* range (≥ 16 " Hg [-54 kPa]): Vacuum level is sufficient to lift the maximum load weight (fig. 1F).
- *Red* range (< 16 " Hg [-54 kPa]): Vacuum level is **not** sufficient to lift the maximum load weight (fig. 2F).

If it takes more than 5 seconds for the vacuum level to reach 5" Hg [-17 kPa] on any vacuum gauge, press on any vacuum pad that has not yet sealed.



Once the pads have sealed, the lifter should be able to maintain sufficient vacuum for lifting, except when used above the maximum Operating Elevation.¹ If it does not:

- Make sure the vacuum switch is adjusted correctly (see [SERVICE MANUAL](#)).
- When necessary, perform the “[Vacuum Test](#)” on page 34.

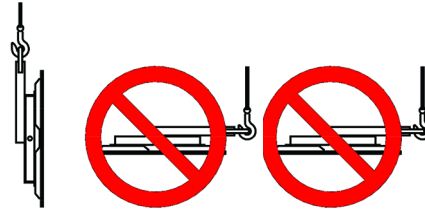
1..... If the lifter is used above the maximum Operating Elevation (see “SPECIFICATIONS” on page 3), it may not be able to maintain sufficient vacuum for lifting. Contact WPG for more information.

OPERATION

To Lift and Move the Load



Never attempt to lift load when lifter is in horizontal orientation.



Interpreting the Lift Light



When vacuum is sufficient to lift the Maximum Load Capacity, the vacuum lift light turns *on* automatically and the vacuum pump turns *off* temporarily, to conserve battery energy.



Never lift load unless lift light is illuminated, because premature lifting could result in load release and personal injury.

When air leaks into the vacuum system, the vacuum pump turns on and off as necessary to maintain sufficient vacuum for lifting.

Monitor Vacuum Indicators

Watch the vacuum lift light and the vacuum gauges (fig. 1A) throughout the entire lift.



Make sure all vacuum indicators remain completely visible.

If the lift light turns off and any ***vacuum gauge shows a level less than 16" Hg [-54 kPa]***:

- 1) Keep everyone away from a suspended load until it can be safely lowered to a stable support.



Stay clear of any suspended load while indicators warn of low vacuum.

- 2) Stop using the lifter until the cause of the vacuum loss can be identified: Conduct the **“Pad Inspection”** on page 37 and perform the **“Vacuum Test”** on page 34.
- 3) Correct any faults before resuming normal operation of the lifter.



Controlling the Lifter and Load

When the lifter is ready, use the hoisting equipment to raise the lifter and load as needed (fig. 1A).

Use any appropriate means (eg, the pad frame or control lines) to keep the lifter and load in the required position.

Once there is enough clearance, you may move the load as required.



In Case of a Power Failure

Vacuum reserve tanks help maintain vacuum temporarily in the event of a battery failure or electrical system failure. Although the lifter is designed to support the load for at least 5 minutes without power, this depends on many factors, including the “[LOAD CHARACTERISTICS](#)” on page 18 and the condition of the vacuum pads (see “[VACUUM PAD MAINTENANCE](#)” on page 37).

If a power failure occurs, keep everyone away from a suspended load until it can be safely lowered to a stable support. Correct any faults before resuming normal operation of the lifter.



Stay clear of any suspended load during power failure.

OPERATION

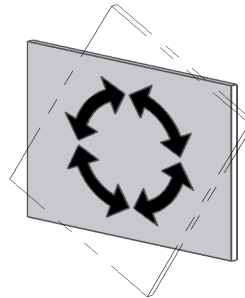
To ROTATE THE LOAD



Make sure load is positioned correctly on lifter (as previously directed).



Keep hands and fingers away from pinch points between pad frame and lift bar.



- 1) Make sure the load has enough clearance to rotate without contacting anyone or anything.
- 2) Use the pad frame or other appropriate means to keep the load under control at all times.



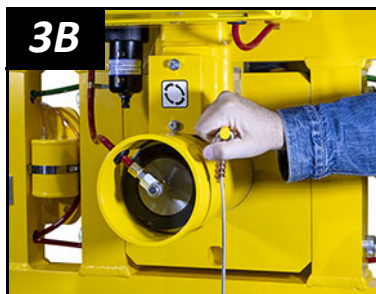
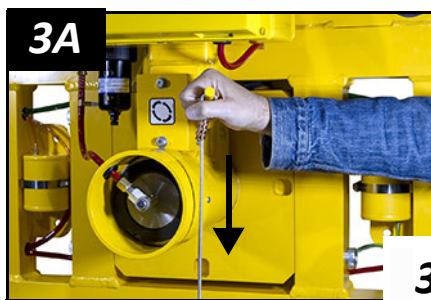
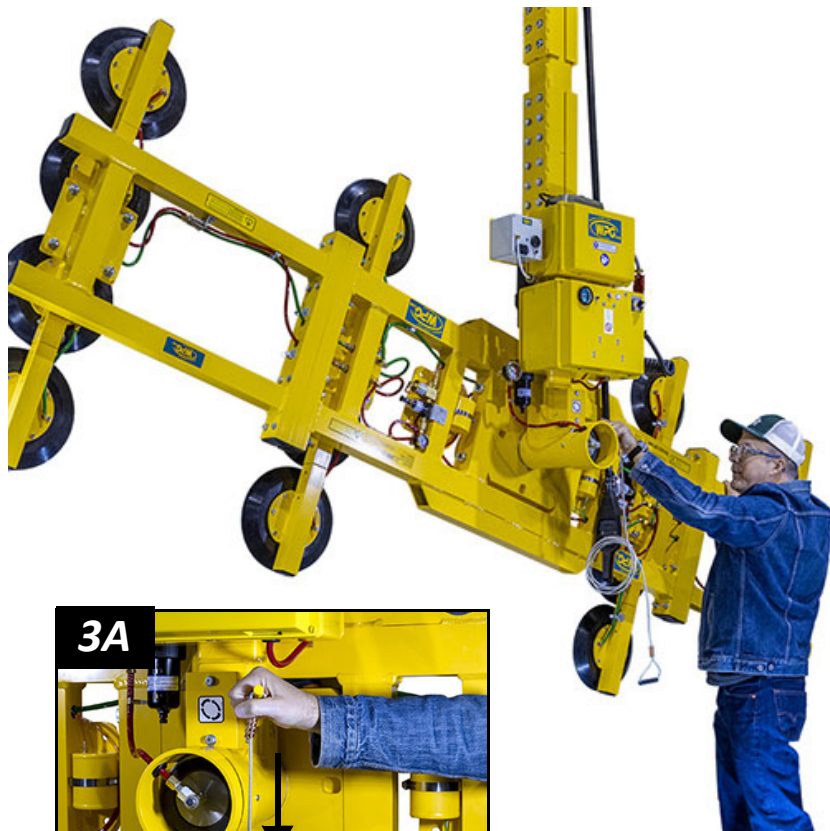
Unbalanced loads may rotate unexpectedly when rotation latch is disengaged.

- 3) Move the rotation release lever downward (figs. 3A-B) to disengage the rotation latch, and rotate the load as required.

Note: Use the attached cable (fig. 3C) to disengage the rotation latch whenever the lifter is suspended beyond the operator's reach.

- 4) To stop load motion, let go of the rotation release lever and guide the load to the next stop.

Note: Whenever rotation is not required, keep the rotation latch engaged, to prevent load damage or personal injury.



OPERATION

TO RELEASE THE PADS FROM THE LOAD





Make sure load is at rest and fully supported before releasing vacuum pads.

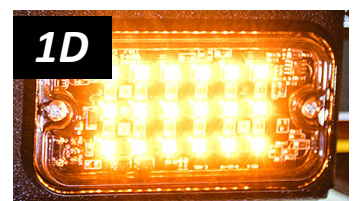
- 1) Press the enable release button on the movable control pendant (fig. 1A) and, at the same time, turn the “attach/release” switch to the “release” position (←| —fig. 1A), to break the vacuum seal.

Note: When the switch is no longer held in the “release” position, it automatically returns to the neutral position (fig. 1B). Do not turn the switch to the “attach” position until the pads are contacting the next load to be lifted.



To use the optional Remote Control System, hold the “function” button () and the “release” button () on the radio transmitter (fig. 1C) or the lifter (see “[OPERATING FEATURES](#)” on page 6).


Note: The strobe light (fig. 1D) flashes while the “function” or “release” button is held, to show the operator that signals are being transmitted and to warn others that the operator may be releasing the load.



OPERATION

- 2) Continue to hold the release controls until the pads disengage completely from the load¹.

After the load is successfully released, the lifter activates the “Power Save” mode automatically.

 **Do not move lifter until pads release completely, because such movement could result in load damage or personal injury.**

- 3) Before you lift another load, perform the Every-Lift Inspection (see “INSPECTION SCHEDULE” on page 32).

AFTER USING THE LIFTER

- 1) Make sure the apply/release switch on the movable control pendant is in the neutral position (fig. 1A).



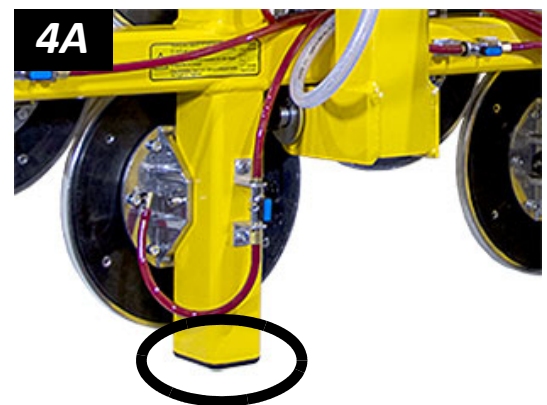
- 2) Place the power switch in the “off” position (○ — fig. 2A).



- 3) Charge the battery after each workday as needed (see “BATTERY RECHARGE” on page 39).²
- 4) Use the hoisting equipment to lower the vacuum lifter gently onto a stable support. Then detach the hoisting hook from the lift point.

Caution: Do not set the lifter on surfaces that could soil or damage vacuum pads.

Parking feet on the pad frame (circled in fig. 4A) can be used to support an unloaded lifter when not suspended. Make sure the lifter leans securely against an appropriate support that does not contact the vacuum pads.



1..... If the pads do not release fully or they release too slowly, perform the “Release Function Test” on page 36 to make sure the release mechanism is functioning correctly.

2..... To maximize battery life, charge it promptly after each use.

OPERATION

Storing the Lifter

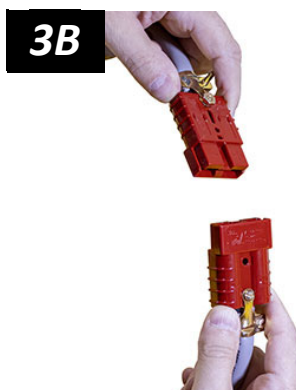
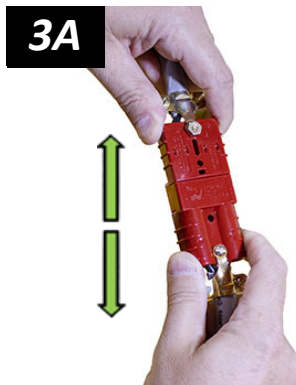
- 1) Use the covers supplied (fig. 1A) to keep the vacuum pads clean.



CE/UKCA — To prevent the lifter from tipping over on relatively horizontal surfaces, place the vacuum pads facedown on a clean, smooth, flat surface. Be careful to protect the vacuum pads while tilting the lifter to the horizontal position. Then place a support under the lift point.

- 2) Charge the battery completely and repeat every 6 months (see “**BATTERY RECHARGE**” on page 39).

- 3) Disconnect the electrical connectors (figs. 3A-B and 3C-D).



- 4) Store the lifter in a clean, dry location. Store the battery between 32° and 70° F [0-21° C]. Avoid storage above 100° F [38° C].

Transporting the Lifter


Secure the lifter in the original shipping container with the original shipping materials or equivalent.

INSPECTIONS AND TESTS

INSPECTION SCHEDULE

Perform inspections according to the following frequency schedule. If any fault is found, correct it and perform the next most frequent inspection before using the vacuum lifter.

Note: If a lifter is used less than 1 day in a 2-week period, perform the Periodic Inspection before using it.

Action	Every Lift	Frequent ¹ (every 20-40 hrs)	Periodic ² (every 250-400 hrs)
Examine <u>vacuum pads</u> for contaminants or damage (see “ Pad Inspection ” on page 37).	✓	✓	✓
Examine load surface for contaminants or debris.	✓	✓	✓
Examine controls and indicators for damage.	✓	✓	✓
Check <u>battery</u> for adequate charge (see “ Checking the Battery ” on page 21).	✓	✓	✓
Examine lifter’s structure for damage.		✓	✓
Examine vacuum system for damage (including <u>vacuum pads</u> , fittings and hoses).		✓	✓
Examine <u>air filters</u> for conditions requiring service (see “AIR FILTER MAINTENANCE” in SERVICE MANUAL).		✓	✓
Perform “ Vacuum Test ” on page 34, “ Dual Vacuum Circuit Test ” on page 36 and “ Release Function Test ” on page 36.		✓	✓
 Perform “ Remote Control System Test ” on page 35.		✓	✓
Check for unusual vibrations or noises while operating lifter.		✓	✓
Examine entire lifter for evidence of: <ul style="list-style-type: none"> • looseness, excessive wear or excessive corrosion • deformation, cracks, dents to structural or functional components • cuts in vacuum pads or hoses • any other hazardous conditions 			✓

INSPECTIONS AND TESTS

Action	Every Lift	Frequent ¹ (every 20-40 hrs)	Periodic ² (every 250-400 hrs)
Inspect entire electrical system for damage, wear or contamination that could be hazardous, in compliance with all local codes and regulatory standards. <i>Caution: Use appropriate cleaning methods for each electrical part, as specified by codes and standards. Improper cleaning can damage parts.</i>			✓

1..... The Frequent Inspection is also required whenever the lifter has been out of service for 1 month or more.

2..... The Periodic Inspection is also required whenever the lifter has been out of service for 1 year or more. Keep a written record of all Periodic Inspections. If necessary, return the lifter to WPG or an authorized dealer for repair (see ["LIMITED WARRANTY"](#) on page 41).

TESTING

Perform the following test to determine whether or not a load surface is too porous or rough:

Lifter/Load Compatibility Test¹

- 1) Make sure the vacuum generating system is functioning correctly (see ["Vacuum Test"](#) on page 34).
- 2) Clean the load surface and the vacuum pads (see ["Pad Cleaning"](#) on page 38).²
- 3) Place the load in the upright position on a stable support.
- 4) Attach the vacuum pads to the load as previously directed.
- 5) After the vacuum pump stops running, place the power switch in the "off" position (○) — (see ["AFTER USING THE LIFTER"](#) on page 29).
- 6) Raise the load a minimal distance, to make sure it is supported by the lifter.
- 7) Watch each vacuum gauge: **Starting from a vacuum level of 16" Hg [-54 kPa], the lifter must maintain a vacuum level greater than 12" Hg [-41 kPa] for 5 minutes.**³ If not, lifting this load requires additional precautions (eg, a load sling). Contact WPG for more information.
- 8) Lower the load *after* 5 minutes or *before* the vacuum level diminishes to 12" Hg [-41 kPa].

Take precautions in case load should fall during test.

1..... The ["Pad-to-Load Friction Coefficient"](#) on page 37 can affect the outcome of this test.

2..... Contaminated loads can cause the vacuum pump to run frequently or continuously. Since excessive pumping quickly reduces battery energy, clean the load whenever possible.

3..... Under CE and UKCA requirements, the lifter must maintain a vacuum level **greater than 8" [-27 kPa]**.


INSPECTIONS AND TESTS


Perform the following tests before placing the lifter in service *initially, following any repair,* when directed in the “*INSPECTION SCHEDULE*” on page 32, or *whenever necessary*:


Operational Tests


Test all features and functions of the lifter (see “OPERATING FEATURES” and “OPERATION”).

Vacuum Test

- 1) Clean the face of each vacuum pad (see “*Pad Cleaning*” on page 38).
- 2) Use a test load with weight equal to the Maximum Load Capacity, a clean, smooth, nonporous surface and other appropriate “*LOAD CHARACTERISTICS*” (see page 18).¹ 
- 3) Attach the lifter to the test load as previously directed. After the vacuum pump stops running, the vacuum level should appear in the green range on each of the vacuum gauges (if not, see “VACUUM SWITCH ADJUSTMENT” in *SERVICE MANUAL*).
- 4) Raise the load a minimal distance and place the power switch in the “off” position (○) — (see “*AFTER USING THE LIFTER*” on page 29).

 **Take precautions in case load should fall during test.**
- 5) Watch each vacuum gauge: *The vacuum level should not decrease by more than 4" Hg [-14 kPa] in 5 minutes.*
- 6) Lower the load after 5 minutes or whenever a lifter fails the test, and release the load as previously directed.

 **Never use lifter that has failed test.**
- 7) Qualified service personnel must correct any fault in the vacuum system before the lifter can be returned to service.


 **This service must be performed by qualified service personnel.**

1..... The load should have either a flat surface or no more curvature than the lifter is designed for, if any.

INSPECTIONS AND TESTS

Rated Load Test¹

The following steps must be performed or supervised by a qualified person:²

- 1) Use a test load that weighs 125% ($\pm 5\%$) of the Maximum Load Capacity and has the appropriate “LOAD CHARACTERISTICS” (see page 18). 
- 2) Attach the vacuum pads to the load as previously directed.
- 3) Position the load to produce the greatest stress on the lifter consistent with “INTENDED USE” on page 18.
- 4) Raise the load a minimal distance and leave it suspended for 2 minutes.
- 5) Once the test is completed, lower and release the load as previously directed.
- 6) Inspect the lifter for any stress damage, and repair or replace components as necessary to successfully pass the test.
- 7) Prepare a written report of the test and keep it on file.




Take precautions in case load should fall during test.



Never use lifter that has failed test.

Remote Control System Test

 Test the remote Control System where the lifter is normally used. Use the radio transmitter to activate each of the remote functions.³ Vary the transmitter's direction and distance from the lifter, to make sure transmissions are effective.⁴

If the Remote Control System is not functioning correctly, ...

- the battery for the radio transmitter may need to be replaced, or;
- metal or other electrically conductive surfaces may be causing radio interference. Reposition the transmitter to transmit signals effectively.

If the problem persists, vary the test conditions, to determine whether there is transmission interference in the work environment or the Remote Control System is not functioning. Correct any fault before using the Remote Control System.

1..... An equivalent simulation may also be used. Contact WPG for more information.

2..... A “qualified person” has successfully demonstrated the ability to solve problems relating to the subject matter and work, either by possessing a recognized degree in an applicable field or a certificate of professional standing, or by possessing extensive knowledge, training and experience.

3..... Use a test material with appropriate “LOAD CHARACTERISTICS” (see page 18) to test the “attach” and “release” functions.

4..... This may require assistance from someone near the lifter, to verify functions are working as intended.

INSPECTIONS AND TESTS

Dual Vacuum Circuit Test

Two vacuum system circuits allow the lifter to maintain the vacuum level in one circuit even if an unexpected vacuum loss occurs in the other one. Verify the function of the circuits, each time the “[Vacuum Test](#)” on page 34 is performed and whenever a fault is suspected, as follows:

- 1) Clean the vacuum pads (see “[Pad Cleaning](#)” on page 38) and attach the lifter to the test material as directed in the “[Vacuum Test](#)” on page 34.
- 2) After the vacuum pumps stop running, monitor the small vacuum gauges (located on the pad frame) as a leak is introduced in one circuit. To introduce a leak, pull up on the edge of one vacuum pad until the vacuum circuit begins to leak. The corresponding vacuum gauge should indicate a loss of vacuum in that circuit.
- 3) As the vacuum level decreases in one circuit, continue to monitor the vacuum gauge for the other circuit, to make sure it maintains its original vacuum level.
- 4) Repeat steps 1-3 to verify the function of the second circuit of the vacuum system. Be sure to introduce the leak at a vacuum pad belonging to the second circuit.
- 5) Qualified service personnel must correct any fault in the vacuum system before the lifter can be returned to service.



This service must be performed by qualified service personnel.

Release Function Test

The Dual Vacuum System employs an adjustable relief valve, in order to actuate the pressurized release function. This relief valve has been set at the factory and normally does not need to be adjusted. However, the release function should be tested each time the “[Vacuum Test](#)” on page 34 is performed, to make sure the release mechanism is working correctly. Release the test material as previously directed (see “[TO RELEASE THE PADS FROM THE LOAD](#)” on page 29) and monitor the release mechanism for the following symptoms:

- Vacuum pads release for only one circuit of the vacuum system (ie, only 1 of the 2 small vacuum gauges shows a decrease in vacuum).
- Vacuum pads release very slowly (ie, requiring more than 2 seconds per each pad in use).
- Lifter does not release at all (ie, both small vacuum gauges show full vacuum).

If any of these conditions is observed during release, the release mechanism is not functioning correctly. Qualified service personnel must correct any fault in the vacuum system before the lifter can be returned to service.



This service must be performed by qualified service personnel.

MAINTENANCE

Note: Refer to [SERVICE MANUAL #36114](#) when applicable.

VACUUM PAD MAINTENANCE

Pad-to-Load Friction Coefficient

The friction coefficient represents the lifter's ability to resist load slippage. The Maximum Load Capacity is based on a friction coefficient of 1, as determined by testing of clean, new, standard rubber vacuum pads on clean, dry, regular glass. ***If the lifter is used under any other conditions, a qualified person must first determine the effective lifting capacity.***¹



Long-term exposure to heat, chemicals or UV light can damage vacuum pads. Replace pads every 2 years or more often when necessary.

Pad Inspection

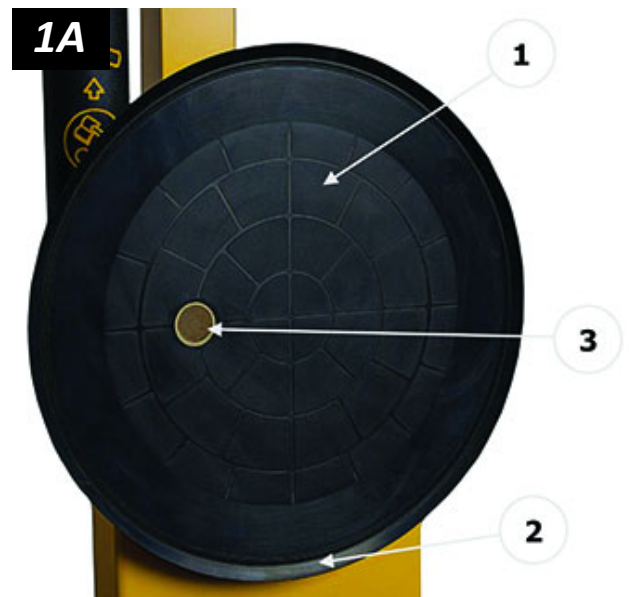
Inspect each vacuum pad (fig. 1A) according to the “[INSPECTION SCHEDULE](#)” on page 32 and correct the following faults before using the lifter (see “[REPLACEMENT PARTS](#)”, when applicable):

- Contaminates on the face (item 1 in fig. 1A) or sealing edges (item 2 in fig. 1A).
- Filter screen (item 3 in fig. 1A) missing from face.



Replace any pad that has damaged sealing edges.

- Nicks, cuts, deformation or abrasions in sealing edges.
- Wear, stiffness or glaze.



1..... A “qualified person” has successfully demonstrated the ability to solve problems relating to the subject matter and work, either by possessing a recognized degree in an applicable field or a certificate of professional standing, or by possessing extensive knowledge, training and experience.

Pad Cleaning

- 1) Regularly clean the face of each vacuum pad (fig. 1A), using soapy water or other mild cleansers to remove oil, dust and other contaminants.



Never use harsh chemicals on vacuum pad.

Solvents, petroleum-based products (including kerosene, gasoline and diesel fuel) or other harsh chemicals can damage vacuum pads.



Never use rubber conditioners on vacuum pad.

Many rubber conditioners can leave a hazardous film on vacuum pads.

- 2) Prevent liquid from entering the vacuum system through the suction hole on the pad face.
- 3) Wipe each pad face clean, using a clean sponge or lint-free cloth to apply the cleanser.¹
- 4) Allow each pad to dry completely before using the lifter.



¹..... A brush with bristles *that do not harm rubber* can help remove contaminants clinging to sealing edges. If these cleaning methods are not successful, contact WPG or an authorized dealer for assistance.

MAINTENANCE

BATTERY RECHARGE¹

Charge the battery whenever the battery gauge shows reduced energy.² **Caution:** Make sure the lifter is powered down.

Identify the input voltage marked on the battery charger and plug it in to an appropriate power source.³

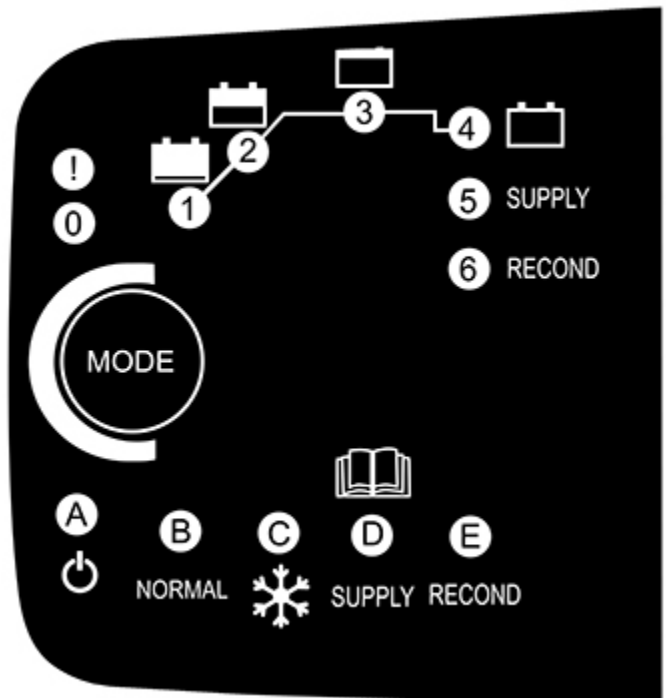


Make sure power source has ground fault circuit interrupter.

Press the “MODE” button to select “NORMAL” mode. Lights 1-4 indicate the charging level attained.⁴ When the battery is fully charged, light 4 (green) turns on and the charger switches to maintenance mode.

The battery should take no more than 8 hours to charge completely.⁵ After reaching level 3, the charger analyzes the battery condition. If the battery needs to be replaced, the charger's red error light (!) turns on (see “REPLACEMENT PARTS” on page 40).

Before you return the lifter to service, recheck the battery as previously directed.



1..... You may use a battery charger other than the one supplied, provided it is designed for 12-volt DC, AGM type, lead-acid batteries. Disconnect the battery from the vacuum generating system before charging.

2..... To maximize the battery's lifespan, charge it promptly after each use.

3..... Any external power supply must conform to all applicable local codes. The lifter is not intended for use while the charger is connected to AC power.

4..... If none of the charging level lights turns on, the battery connection or the battery itself may be faulty. If the red error light (!) turns on immediately, the battery leads may be reversed or the charger terminals may be short-circuited; once the problem has been corrected, the charger should function normally. The red error light can indicate other problems, depending on the mode selected and level of charging; if necessary, contact WPG for assistance.

5..... The charger automatically reduces the charging rate when the battery is fully charged.

REPLACEMENT PARTS

Stock No.	Description	Qty.
65442CA	Vacuum Hose – 0.16" ID x 1/4" OD – Red	*
65440	Vacuum Hose – 0.245" ID x 3/8" OD – Red	*
65438	Vacuum Hose – 1/8" ID x 1/4" OD – White	*
65437	Vacuum Hose – 0.245" ID x 3/8" OD – Green	*
65429BM	Vacuum Hose – 0.16" ID x 1/4" OD – Green	*
65010	Pad Spring – Coil Type	16
64713AU	Battery Charger – 7 Amp – 240 V AC – Australian Type	1
64712US	Battery Charger – 7 Amp – 100 / 120 V AC	1
64711EU	Battery Charger – 7 Amp – 240 V AC	1
64682	Battery – 1.5 V DC – AA Alkaline (for optional radio transmitter)	2
64667	Battery – 12 V DC – 28 Amp-Hours	1
64283	Bulb – 13 V – Bayonet (for vacuum lift light)	1
64262	Green Lens (for vacuum lift light)	1
58197	Remote Control System Retrofit Kit (optional)	1
58168	Guard for Rotating Union	1
54392NC	Battery Connector – Twin Lead	1
53132	Hose Fitting – Tee – 5/32" ID	6
53126	Pad Fitting – Tee – 3/64" ID	8
53120	Pad Fitting – Elbow – 3/64" ID	8
49646T	Vacuum Pad – Model G3370 / 11" [28 cm] Diameter – Lipped	16
49150	End Plug – 2-1/2" x 2-1/2" x 1/4" Tubing Size	4
49130	End Plug – 2" x 3" x 1/4" Tubing Size	8
49122	End Plug – 2" x 2" x 1/4" Tubing Size	8
29353	Pad Cover	16
16057	Quick Connector – 1/8 FNPT – Male End	16
16056	Quick Connector – 1/8 FNPT – Female End	16
15630	Pad Filter Screen – Large	16
15333	Hose Fitting – Tee – 1/4" OD – Push-In	1
13516	Cotterless Hitch Pin – 3/8" x 4"	8
11124	Hex Nut – 1/2-13 Thread – 85 ksi (for lift bar & rotating pad arms)	40
11120	Hex Nut – 3/8-16 Thread – 85 ksi (for removable sections of pad frame)	16
10900	Shoulder Bolt – Socket Head – 5/16" x 1/2" x 1/4-20 Thread (for mounting pads)	96
10863	Bolt – Hex Head – 1/2-13 Thread x 6-1/2" – Grade 5 (for lift bar)	24
10834	Bolt – Hex Head – 1/2-13 Thread x 1-1/2" – Grade 5 (for rotating pad arms)	16
10822	Bolt – Hex Head – 3/8-16 Thread x 5" – Grade 5 (for removable sections of pad frame)	16

* – Length as required; sold by the foot (approx 30.5 cm).

See **SERVICE MANUAL #36114** for additional parts.

**SERVICE ONLY WITH IDENTICAL REPLACEMENT PARTS,
AVAILABLE AT WPG.COM OR THROUGH AN AUTHORIZED WPG DEALER**

LIMITED WARRANTY

Wood's Powr-Grip® (WPG) products are carefully constructed, thoroughly inspected at various stages of production, and individually tested. They are warranted to be free from defects in workmanship and materials for a period of one year from the date of purchase.

If a problem develops during the warranty period, follow the instructions below to obtain warranty service. If inspection shows that the problem is due to defective workmanship or materials, WPG will repair the product without charge.

Warranty does not apply when ...

- modifications have been made to the product after leaving the factory
- rubber portions have been cut or scratched during use;
- repairs are required due to abnormal wear and tear, and/or;
- the product has been damaged, misused or neglected.

If a problem is not covered under warranty, WPG will notify the customer of costs prior to repair. If the customer agrees to pay all repair costs and to receive the repaired product on a C.O.D. basis, then WPG will proceed with repairs.

TO OBTAIN REPAIRS OR WARRANTY SERVICE

For purchases in *North America*:

Contact the WPG Technical Service Department. When factory service is required, ship the complete product – prepaid – along with your name, address and phone number to the street address listed at the bottom of this page. WPG may be reached by phone or fax numbers listed below.

For purchases in all *other localities*:

Contact your dealer or the WPG Technical Service Department for assistance. WPG may be reached by phone or fax numbers listed below.

Wood's Powr-Grip Co., Inc.

908 West Main St.

Laurel, MT 59044 USA

406-628-8231 (phone)

800-548-7341 (phone)

406-628-8354 (fax)

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PROFESSIONALS • READ AND UNDERSTAND
BEFORE ROUTING, WIRING AND/OR ASSEMBLING



**MANUAL ROTATOR 2800,
DC-VOLTAGE WITH DUAL
VACUUM SYSTEM**
(Available with REMOTE CONTROL SYSTEM)

Model number: MR1611LDCCO



908 W. Main • P.O. Box 368
Laurel, MT USA 59044
800-548-7341 (phone) • 406-628-8231 (phone)
406-628-8354 (fax) • www.WPG.com

FILE DIRECTORY:
FILE (SHEET): 713-W07 [W07]

TYPE: STANDARD

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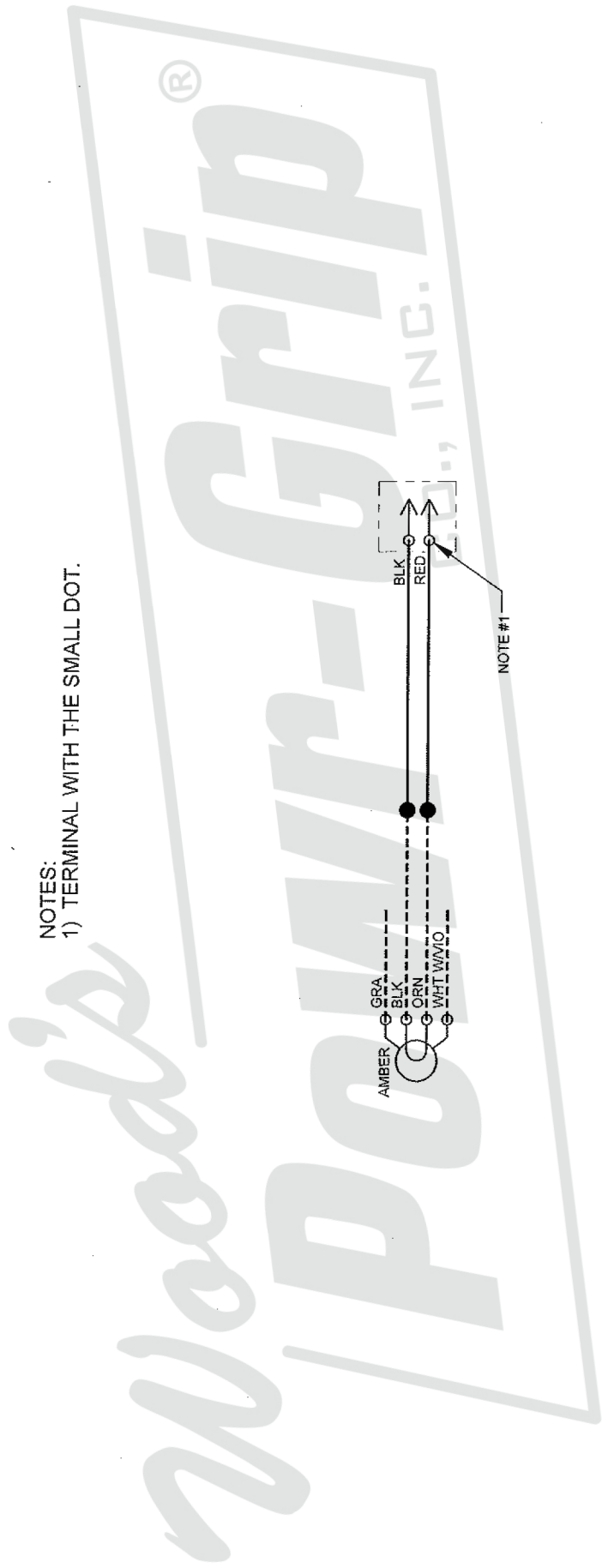
DC2 VACUUM CONTROL SYSTEM
N/A
STROBE LIGHT WIRING SCHEMATIC, LONG
D713-W07 [W07]

SIZE: A	SCALE: NONE	REVISION: 01.A	ECN NUMBER: 4016	ECN DATE: 07/06/2016	ECN BY: JAC	EST. WEIGHT: N/A
---------	-------------	----------------	------------------	----------------------	-------------	------------------

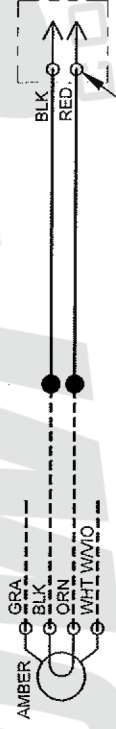
WIRE LEGEND: CONTROLLED BY WIRING SYMBOLS DRAWING EXCEPT AS NOTED AND BELOW.
LINE STYLES AND WIDTHS FOR WIRE UNLESS NOTED OTHERWISE.

.....	18AWG	---	20AWG
-----	N/A	---	N/A

PRODUCT MANAGER: SEAN E.
DATE: 03/04/2013
CHECKED: CR
APPROVED: *MM*
DATE: 8-22-16



NOTES:
1) TERMINAL WITH THE SMALL DOT.



FILE DIRECTORY:

FILE [SHEET]:

TYPE: STANDARD

714-**W01 [W01]**

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3 SCFM DC POWER UNIT

N/A

BATTERY CHARGER WIRING DIAGRAM
D714-W01 [W01]

SIZE: A	SCALE: NONE	REVISION: 01.A	ECN NUMBER: 3623	ECN DATE: 01/07/2015	ECN BY: LER	EST. WEIGHT: 0 LBS
---------	-------------	----------------	------------------	----------------------	-------------	--------------------

WIRE LEGEND: CONTROLLED BY WIRING SYMBOLS DRAWING EXCEPT AS NOTED AND BELOW.

LINE STYLES AND WIDTHS FOR WIRE UNLESS NOTED OTHERWISE.

18 AWG	---	N/A
16 AWG	---	N/A

PRODUCT MANAGER: NATHAN G.

CHECKED: *CR*

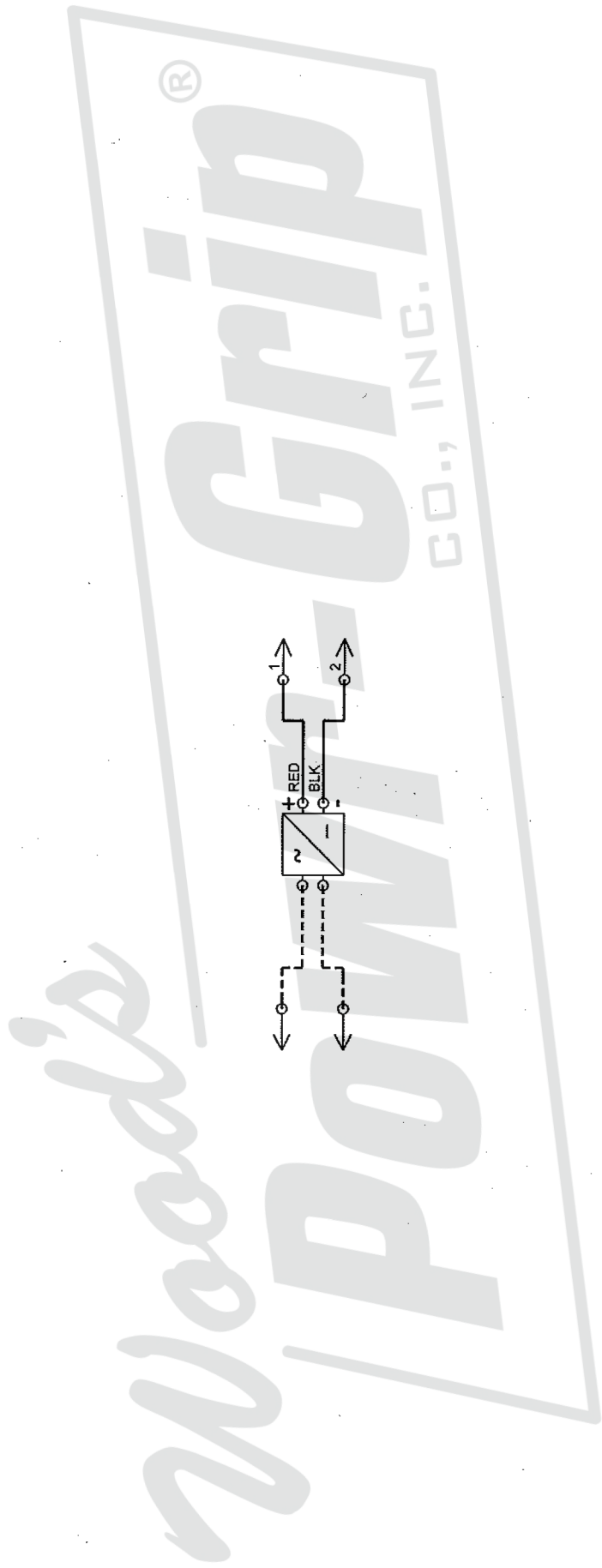
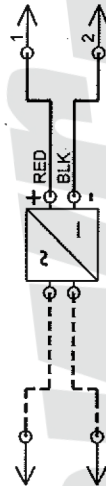
APPROVED: *chmn*

DATE:

10/21/2009

01-19-15

2-16-15



TYPE: STANDARD

FILE DIRECTORY: 714A-W01 [A-W01]

FILE (SHEET):

NOTES:
(1) GOLD TERMINAL.

WIRE LEGEND: CONTROLLED BY WIRING SYMBOLS DRAWING EXCEPT AS NOTED AND BELOW.

LINE STYLES AND WIDTHS FOR WIRE UNLESS NOTED OTHERWISE.

20AWG	N/A	16AWG	10AWG
18AWG	N/A	14AWG	

PRODUCT MANAGER: DANIEL M.

CHECKED: CR

APPROVED: *Chuan*

DATE: 03/07/1993

REVISION: 03.A

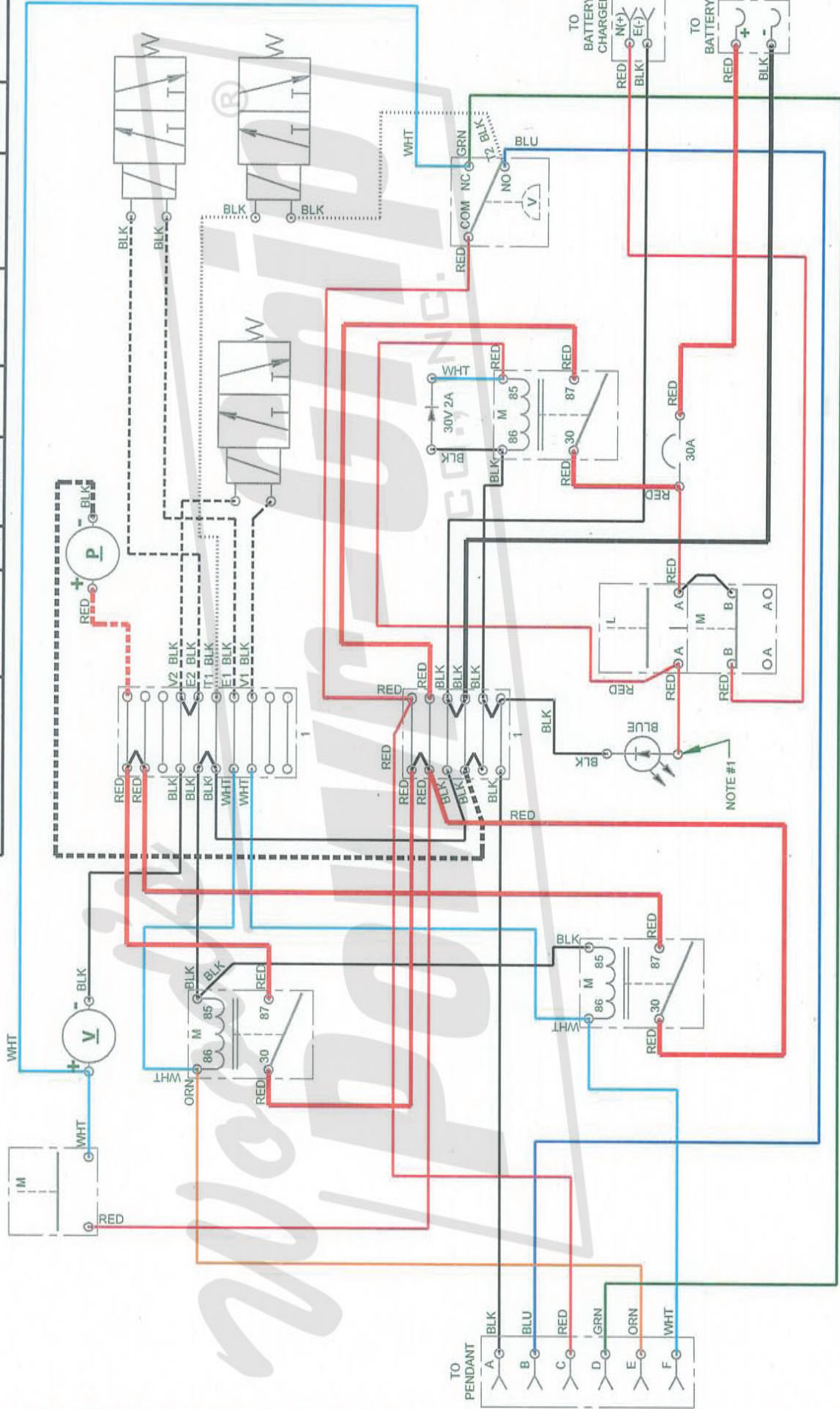
ECN NUMBER: 4599

ECN DATE: 05/25/2018

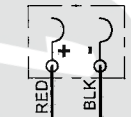
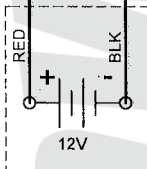
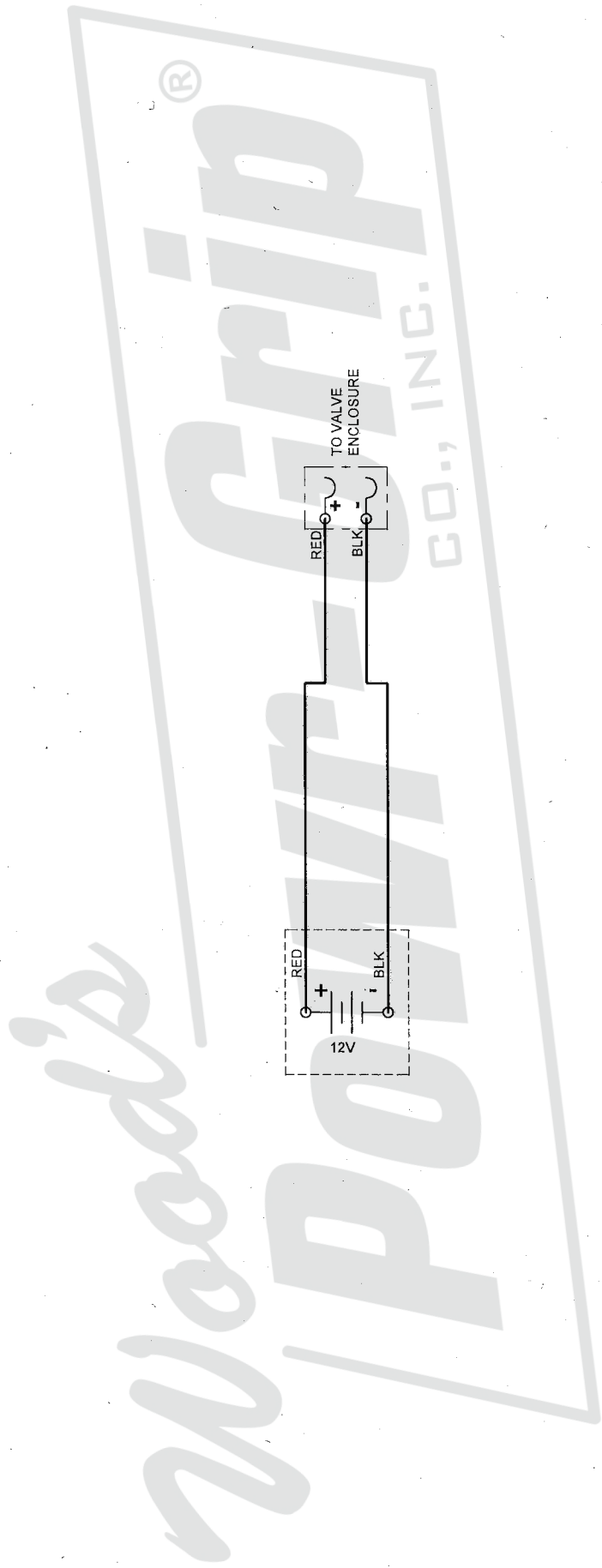
EST. WEIGHT: N/A

3 SCFM DC VACUUM SYSTEM
 MANUAL MOTION
 VACUUM ENCLOSURE WIRING SCHEMATIC, DUAL-HEAD PUMPS
 D714A-W01 [A-W01]

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WIRE LEGEND: CONTROLLED BY WIRING SYMBOLS DRAWING EXCEPT AS NOTED AND BELOW. LINE STYLES AND WIDTHS FOR WIRE UNLESS NOTED OTHERWISE.		TYPE: STANDARD		DIRECTORY: 714A-W02 [A-W02]	
----- N/A ----- 10 AWG	----- N/A ----- N/A	THIS DRAWING IS THE PROPERTY OF WOOD'S POWR-GRIP CO., INC. LAUREL, MONTANA U.S.A. IT IS LOANED WITH THE UNDERSTANDING THAT NEITHER IT NOR ANY INFORMATION CONTAINED THEREIN WILL BE COPIED, PUBLISHED OR TRANSMITTED TO OTHERS WITHOUT EXPRESS WRITTEN PERMISSION.		H:\Working\STD\714-DCPP\ECN22881	
DRAWN: J. ROLFSRUD	DATE: 03/07/1993	3 SCFM DC POWER UNIT GAUGE OPTION		BY: LER	
CHECKED: CR	DATE: 05-10-10	BATTERY ENCLOSURE WIRING DIAGRAM D714A-W02 [A-W02]		DATE: 04/28/2010	
APPROVED: Cam	DATE: 5-10-10	SCALE: A	REV: 6	ECN NUMBER: 2288	BY: LER



TO VALVE
ENCLOSURE

TYPE: **STANDARD**
 FILE DIRECTORY: **714A-W03 [A-W04]**
 FILE (SHEET):

WIRE LEGEND: CONTROLLED BY
 WIRING SYMBOLS DRAWING
 EXCEPT AS NOTED AND BELOW.
 LINE STYLES AND WIDTHS FOR
 WIRE UNLESS NOTED OTHERWISE.
 --- 16AWG
 --- N/A
 --- N/A

PRODUCT MANAGER:
NATHAN G.
 DATE: **09/16/2010**

CHECKED: *CR*
 APPROVED: *Clan*

SIZE: **A** NONE
 REVISION: **01.A** 3636
 ECN NUMBER: **01/19/2015**
 ECN DATE: **CCH**
 EST. WEIGHT: **0 LBS**

3 SCFM DC POWER UNIT
 GAUGE
 2-ACTION PENDANT WIRING SCHEMATIC
 D714A-W03 [A-W04]

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WPG LAUREL, MONTANA U.S.A.

- NOTES:
 1) SUBSTITUTE YELLOW WIRE FOR BLUE
 IF BLUE WIRE IS UNAVAILABLE.
 2) SUBSTITUTE BROWN WIRE FOR ORANGE
 IF ORANGE WIRE IS UNAVAILABLE.

